REMARKS:

1) Regarding the Office Action Summary Form PTO-L-326 it is respectfully requested that the Examiner checkmark the box to indicate whether the originally filed drawing is acceptable. The Examiner is further respectfully requested to acknowledge the receipt of the Priority Document of the corresponding German Patent Application DE 102 29 309.0 and the respective priority claim.

2) The rejection of claim 8 under 35 USC 112(2) is respectfully traversed. Claim 8 has been amended to refer to the emulsion quality. Examples of the emulsion quality are disclosed in the original specification page 9 lines 10 to 18. Withdrawal of the formal rejection of claim 8 is respectfully requested.

3) The rejection of claims 1 to 15, 18, and 25 under 35 USC 103(a) is respectfully traversed because US Patent 6,736,867 (Varadaraj et al.) does not suggest the present invention as now more clearly claimed.

4) The present specification discloses on page 3 starting at line 7 that it is the purpose of this invention to process black water and gray water as a source of hydrogen molecules for use in high temperature fuel cells whereby the wastewater must be sufficiently pre-cleaned to make it suitable for use in a high temperature fuel cell. The present specification makes it also clear on page 11 lines 3 to 5 that the pretreatment of the water

in the pretreatment station 15 is performed only to the extent necessary to make the water suitable for the emulsification. Therefore the cleaning operation of the wastewater is not critical. Please, see in this connection also page 6 lines 11 to 23 of the present specification, where it is said that filtration must remove solid components from the wastewater and the degree of the water quality is of secondary importance, see lines 22 and 23 on page 6 of the present specification. Thus, a person of ordinary skill in this art, at the time the invention was made, understands from the just cited passages of the present disclosure, that distillation and deionization of the wastewater is not necessary for the purpose of this invention. The proposed clarifications in the specification regarding avoiding distillation merely say expressly what is inherent in the original disclosure. Therefore, new matter is not involved in these proposed clarifications.

5) The discovery that wastewater including wash water, kitchen water and even toilet water can be used for the present purposes is unexpected and surprising because the primary reference US Patent 6,736,867 (Varadaraj et al.) makes it quite clear that: "Distilled and deionized water is suitable. Water generated from the operation of the fuel cell system is preferred." Please see col. 4 lines 48 to 50 of the Varadaraj et al. disclosure. Water prepared by the fuel cell is distilled water particularly if the fuel cell is a high temperature fuel cell. In the sentence bridging pages 2 and 3 of the Office Action the Examiner has assumed that "highly purified water, in the process of preparing

the emulsion as fuel for the fuel cell, is a necessity." Varadaraj et al. support this position. However, surprisingly, highly purified water is not necessary for the present purposes.

6) In view of the above, claim 1 has been amended to emphasize the collecting of wastewater and processing the wastewater by one or more steps of filtration, reverse osmosis and cleaning but excluding distillation to produce prepared wastewater which is then used to emulsify the liquid hydrogen fuel with the prepared wastewater to form the emulsion as fuel for the high temperature fuel cell. Such a procedure is not suggested by the disclosure of Varadaraj et al. because the entire content of Varadaraj et al. makes it clear that highly purified water is necessary for the purposes of Varadaraj et al.

7) Advantages of the invention are seen in that, for example in a passenger aircraft, no extra clean water needs to be carried on board for the operation of a high temperature fuel cell. Rather, even toilet water can be used for the present purposes. This means, that less water must be taken on board prior to a flight which in turn reduces the weight of the aircraft which in turn reduces the use of fuel. Such advantages cannot be achieved by the teachings of Varadaraj et al. because they need "highly purified water".

8) With regard to claim 2 the step of cracking the liquid hydrocarbon fuel to convert an initially long hydrocarbon chain into a short chain bond is not suggested by Varadaraj et al.

because col. 2 lines 4 to 35 merely speaks of forming a "syngas mixture" and does not refer to cracking.

9) With regard to claim 3 Varadaraj et al. do not disclose anything regarding catalytically withdrawing sulfur and sulfur components from the emulsion prior to using the emulsion as a fuel. Varadaraj et al. merely suggest that one should start with a hydrocarbon fuel that has a low or no sulfur content. Please see col. 4, lines 27 to 33 of Varadaraj et al. According to the invention any liquid hydrocarbon fuel regardless of sulfur content can be used for the emulsification and the sulfur is then removed from the resulting emulsion in the catalyst 2. Using filtered or cleaned wastewater for emulsifying the liquid hydrocarbon fuel regardless of the sulfur content of the cleaned wastewater is different from the teaching that one should start with highly purified water with a low sulfur content fuel. With regard to claim 25 no independent protection is sought for the use of kerosene.

10) With regard to claims 4 to 7 it is important to consider that claim 4 calls for using "prepared wastewater" in the emulsifying step. The passages quoted on page 3 of the Office Action namely col. 3 lines 5 to 23, col. 5 lines 22 to 68 and col. 6 lines 1 and 2 of Varadaraj et al. disclose nothing about the use of prepared wastewater and therefore do not suggest the use of wastewater.

11) Claim 8 has been amended to define a closed loop control in response to emulsion quality parameters. The original specification page 9, line 8 supports this clarification. Varadaraj et al. neither disclose nor suggest a closed loop control. The cited lines 59 to 63 in column 3 of Varadaraj et al. merely disclose that different start-up time durations are required for different systems.

12) With regard to claims 11 and 12 nothing is disclosed in Varadaraj et al. regarding the use of dosing the prepared wastewater. No closed loop control of feed pumps is disclosed much less suggested by Varadaraj et al. The same applies to claim 13 since Varadaraj et al. do not disclose any emergency shut down step.

13) With regard to claim 9 the cited passages in col. 6 lines 62 to 68 and col. 7 lines 1 to 14 of Varadaraj et al. do not suggest the features of claim 9 which calls for starting the high temperature fuel cell with CH_4 fuels until an operating temperature of the high temperature fuel cell is reached and then switching over to fueling the fuel cell with the emulsion. Varadaraj et al. mention in the passage bridging cols. 6 and 7 that the emulsion composition will be fed as start-up fuel to the reformer of a fuel cell system. When the start-up is completed a hydrocarbon steam composition is used as fuel for the reformer. The present emulsion is used as fuel for sustaining the operation of the high temperature fuel cell, after start-up, not for starting the reformer.

14) With regard to claim 14, performing the cracking step inside a separate housing positioned inside the enclosure of the high temperature fuel cell is not suggested by Varadaraj et al. because the cited passages say nothing at all about cracking inside the enclosure of the high temperature fuel cell. The same applies to claim 15 which calls for sustaining the cracking step with thermal energy from the high temperature fuel cell.

15) With regard to claim 18 it must be repeated that Varadaraj et al. prefer to start with a hydrocarbon fuel component that has either less than 20 ppm or preferably does not contain any sulfur at all. Please see Varadaraj et al. col. 4, lines 32, 33. Once the starting condition is assured, it is of no concern to Varadaraj et al. how the sulfur was removed from the hydrocarbon fuel prior to using the hydrocarbon fuel in the process of Varadaraj et al. Claim 18 calls expressly for chemically binding the sulfur and sulfur compounds from the emulsion, not prior to emulsifying to form stable compounds and avoiding discharging the compounds into the atmosphere. This is an important teaching because it protects the environment which is not suggested by Varadaraj et al. because they need to start with a hydrocarbon fuel that has been cleaned of sulfur and sulfur components prior to using the hydrocarbon fuel for the purposes of Varadaraj et al.

16) The rejection of claims 16, 17, 19, 20, 21, 22, 23 and 34 under 35 USC 103(a) as being unpatentable over Varadaraj et al. taken in combination with the disclosure of US Patent 5,747,185 (Hsu) is respectfully traversed for the following reasons. Claims 16

and 17 define the catalytic withdrawing of the sulfur and sulfur components in a housing (2A) which is itself positioned inside the enclosure (4) of the high temperature fuel cells (10) so that the thermal energy of the high temperature fuel cell can be used for performing the desulfurization of the emulsion already formed. Hsu teaches to use materials in a high temperature fuel cell that are sulfur tolerant. For this purpose a nickel catalyst must be present in the fuel electrode of the fuel cell, col. 8, lines 1 to 5. Contrary thereto, according to the invention, the catalyst (2) is not part of the fuel electrode in the high temperature fuel cell but rather is housed in a separate housing which in turn is housed in the enclosure of the high temperature fuel cell. Hsu mentions in col. 8, lines 37 to 49 that "a number of fuel processing tasks" can be performed internally, such as fuel reforming, but he needs a fuel electrode having a "catalytic nature". No such "catalytic nature" is required for the electrodes of the fuel cells used by the present invention.

17) The features of claims 19 and 20 are not suggested by the combination of Varadaraj et al. with Hsu because neither of the references teaches cracking molecular bindings in the emulsion much less suggests passing the emulsion through an electric gap to perform a gap-electrolysis process for the cracking. The same considerations apply to claims 21, 22, 23 and 24 which define forming the electric gap between two electrically conducting members arranged concentrically one within the other and connected to a d.c. power source which in the case of claim 22

is the high temperature fuel cell itself acting as a d.c. power source. The two references taken singly or in combination do not make any suggestions in this respect.

18) Withdrawal of all rejections of claims 1 to 25 is respectfully requested.

19) Claim 26 repeats the features of claim 1 with different wording defining a closed group of wastewater cleaning steps. Hence, the above remarks in support of the patentability of claim 1 apply equally to claim 26.

20) Apparatus claims 27 to 32 have been added based on the original disclosure as follows. Claim 27 is based on the originally disclosed features of claims 1 and 3. Claim 28 is based on claim 16. Claim 29 is based on claim 19 and the originally filed drawing. Claims 30 and 31 are based on claim 20 and claim 21 respectively. Claim 32 is based on claim 22. The above remarks in support of the patentability of claims 1 to 25 also support the patentability of apparatus claims 26 to 31.

21) Favorable reconsideration and allowance of the application, including all present claims 1 to 32 are respectfully requested.

Respectfully submitted,
Claus HOFFJANN et al.
Applicant

WGF:kd/4532
Enclosures:

By W. G. Fasse

Wolfgang G. Fasse
Patent Attorney
Reg. No.: 21187
Tel. 207-862-4671
Fax. 207-862-4681
P. O. Box 726
Hampden, ME 04444-0726

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W. G. Fasse 12-1-05

Name: Wolfgang G. Fasse - Date: December 1, 2005